

**Effects of the COVID-19 Pandemic on the Opioid Epidemic in Allegheny County, PA:
A Death Narrative Analysis**

by

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Abstract

Introduction: In Allegheny County, long-lasting effects of the pandemic on overdose-related deaths for residents is still not fully known.

Methods: ACHD's overdose surveillance group received overdose-related death records from the Allegheny County Office of the Medical Examiner (ACOME). Each narrative in the cumulative set was read for frequencies of key themes of interest relating to overdoses and the pandemic. Trends were observed to determine when the highest amount of fatal overdose deaths occurred and identify topics that appeared to play significant roles in the lives of those who use substances.

Results: ACHD received 465 death narratives. The preliminary number of overdose deaths in 2020 was higher than that of 2019 by approximately 64 deaths. The red restriction phase that marked the beginning of the stay-at-home order experienced significantly more deaths per day than other restriction phases. Case themes of housing insecurity significantly increased after the stay-at-home order took place. There was a decreasing trend in cases discussing naloxone distribution after the stay-at-home order was declared.

Conclusion: Effects of the COVID-19 Pandemic and accompanying policies impacted those who use opioids. Policy changes need put in place to provide safety-net resources that will prevent marginalized populations from being harmed from necessary public health precautions.

This work can inform knowledgeable disaster-prevention methods and for education on stigmatized health disparities that can be exacerbated in system-stressing events.

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Preface

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both, and I am immensely grateful for you. To Casey and Michelle, thank you for always adding so much joy to my life. To Emily, am forever indebted to you for your support of my dreams and for so many years of extraordinary friendship. To Nikush thank you for the unwavering support and love, and for meeting me wherever I was at a moment's notice. And to my family, thank you for always believing in me. Thank you, Brooke and Nikki, for always lending a listening ear and cheering me on. Thank you to my younger brother, Luke, for always being by my side. I would not be the person I am today without you. Mom and Dad, I hope I can continue to make you proud for all of the love you have given to me and for all you have done for me. Thank you.

1.0 Introduction

The COVID-19 pandemic has altered life for many and provided significant challenges in a time when the United States (US) is already battling with a persistent opioid epidemic. The vulnerable populations of those that suffer from opioid use disorder (OUD) and those who use opioids in conjunction with other substances could face more consequences than the average population. Though long-term effects from the coronavirus pandemic are unknown, many cities and states are already seeing trends of increased opioid-related overdoses (Slavova, Rock, Bush, Quesinberry, & Walsh, 2020). Some federal and state mandates have increased some access to treatment in an attempt to curb the isolation of the pandemic (Davis & Samuels, 2020). However, these mandates may not be enough to combat the pre-existing hesitancy of the system to aid those with OUD as they require support from medical systems.

1.1 Pre-existing Complications

The opioid epidemic has evolved into three waves. The first wave consisted of mainly prescription opioids, such as hydrocodone and oxycontin. The second wave consisted of mainly heroin, and the mortality surpassed that of the first wave. The third wave currently taking place consists of fentanyl, its analogues, and other synthetic opioids. This third wave's mortality has risen continuously since 2013 and shows no signs of flattening out (Ciccarone, 2019).

The number of annual deaths from opioid-related overdoses exceeds the number of annual deaths from gun violence, from motor vehicles accidents, and from HIV 19 pandemic. Further, the

opioid epidemic does not appear to be improving anytime soon, even with the few current prevention efforts the United States does have (C D C, 2021; Project HOPE, 2014). Unintentional injuries, made up in large part by opioid overdoses, was the leading cause of death among ages 1-44 in 2019 (CDC, 2020).

1.1.1 Biological pathway to susceptibility

Those who use opioids are predisposed to health complications that may both exacerbate and be exacerbated by COVID-19. It is well-documented that COVID-19 can give rise to pneumonia; however, this respiratory issue may pose a more serious threat for those who experience OUD (Ahn et al., 2020). Opioids cause respiratory depression, which can result in hypoxemia. This may cause bleaker outcomes for those with COVID-19, as COVID-19 primarily attacks the lungs (Schimmel & Manini, 2020). It is also reasonable to fear that the intersection of these two lung afflictions may be catalyzed by individuals participating in polysubstance abuse that affects the lungs, such as smoking or vaping. These issues could compound and complicate the intersection further.

Physical immunity may also be compromised for those who use opioids who contract COVID-19. Though research is still occurring, drugs in the opiate family may be linked to immunosuppression and further complications (Schimmel & Manini, 2020). For related diseases such as SARS, some modeling research has shown evidence of hindered T cell function and possible association with lung injury (Zhao, Zhao, & Perlman, 2010). Further, the act alone of injecting opioids can greatly hinder immune response. Currently, there is concern regarding the synergetic spread of HIV and Hepatitis C Virus transmission (HCV). Both of these viruses spread readily through sharing syringes, leaving those who use opioids at heightened susceptibility for

multidimensional disease combinations. In Scott County, Indiana, researchers found that of those with newly-diagnosed HIV, 88% reported self-injecting opioids recently (Peters et al., 2016). This sharp influx of newly-diagnosed HIV cases results in an increase of immunocompromised people susceptible to COVID-19 (Mirzaei, McFarland, Karamouzian, & Sharifi, 2021). Within the body, these disadvantages may provide COVID-19 the perfect opportunity for infection, especially if the biological environment promotes transmission.

1.2 The Criminal Justice System

The criminal justice system has fostered a close relationship with those who use opioids, and thus may be catalyzing the spread of COVID-19. If a person interacts with the system, they are criminally charged more often than they are sent to rehabilitative treatment centers. Researchers have found that those with substance use have such frequent run-ins with the prison system that over half of US state prisoners and approximately two thirds of county jail prisoners report significant substance use (Brinkley-Rubinstein et al., 2018). Within mass incarceration centers, inequities continue. HIV is five times more prevalent in federal and state prisons in the United States than in the rest of the population, meaning that the incarcerated population is also immunocompromised (Beckwith, Zaller, Fu, Montague, & Rich, 2010). When comparing detainees and non-detainees of the same age, detainees have significantly poorer health, made worse by higher prevalences of both infectious and chronic diseases (“Guidance on Management of Coronavirus Disease 2019 (COVID-19) in Correctional and Detention Facilities | CDC,” n.d.).

Both the large amount of incarceration in the United States and the epidemic of opioid use allow great opportunity for SARS-CoV-2 to spread. Prevention strategies such as physical

distancing and quarantining are nearly impossible to implement in prisons. Crowded prisons with staff and volunteers who come and go along with poor hygiene and inadequate medical care offer microcenters perfect for widespread infection (Mukherjee & El-Bassel, 2020). In the Wuhan province of China during February of 2020, almost half of the incident cases were located in the prison system (Barnert, Ahalt, & Williams, 2020). Prisons prove to be a petri dish for infectious diseases, and COVID-19 is thriving in these environments.

1.3 Opioid Treatment-Related Policy

Delivering care to those with OUD and those recovering from using opioids already face a multitude of boundaries. Many people commonly believe that those with any substance use disorder (SUD) have large character flaws and weak, failed morals. This stigma still persists within the healthcare setting (Volkow, 2020). As those who engage in opioid use face social barriers to care vital to life, policies can either address or exacerbate these barriers.

Policies have changed for those with OUD due to the intersection of pandemic and epidemic, some beneficial and some harmful. Some local and state governments have modified law to prevent those with OUD from being engulfed by the criminal justice system (Davis & Samuels, 2020). With more than 40 states reporting increases in opioid-related mortality, federal agencies have also taken action. The United States Drug Enforcement Agency (DEA) and the US Substance Abuse and Mental Health Services Administration (SAMHSA) have temporarily changed policy to remove some barriers to accessing medication-assisted treatments such as methadone and buprenorphine. Some of these policies include decreasing the strict prescription

requirements and allowing larger quantities to be prescribed in an effort to reduce the frequency of times people must return to the clinic (A M A, 2021).

Not all policy changes have proved beneficial for those who use opioids. Some communities substantially impacted by the opioid epidemic have done harm. In West Virginia, a state encompassing many hotspots of the opioid epidemic, one county has removed evidence-based preventative measures by passing legislation to stop needle-exchange programs. As a result, they are facing an HIV outbreak larger than that of any other county in the country, increasing the number of those with weakened immune systems in the middle of a pandemic (Raby, 2021).

Certain policies that prove to be beneficial for the prevention of COVID-19 have the potential to be harmful for those who are currently experiencing and recovering from opioid use. Social gathering restrictions are important measures to prevent further spread of infectious diseases, but a lack of social support due to isolation can be substantially harmful to those with all SUD (Volkow, 2020). These individuals may also lose access to needle-exchange programs and other facilities that were ordered to close such as those that provide food, water, and shelter. When these facilities close, the marginalized populations they serve lack the necessities to shelter in place. The vulnerable population of those suffering from OUD should be considered in every policy change. COVID-19 prevention efforts are vital to the United States, but safety nets must be put in place to capture those vulnerable populations who will possibly be harmed by these policy changes.

1.3.1 Opportunity for Policy Change

In a country where COVID-19 has claimed a considerable number of deaths, some individuals state that life may never return to the original state of normalcy. In some terms, it

should not. The policy changes written in local, state, and federal governments provide an opportunity to enact change that can benefit those with OUD for years to come by promoting policies that increase access to resources proven to support those with OUD (Babu, Brent, & Juurlink, 2019). The AMA has urged that these federal policy changes be made permanent. Some researchers have proposed strategies that can make these policy changes sustainable, such as authorizing pharmacists to provide overdose prevention medications and prescriptions for medication-assisted treatment (Green, Bratberg, & Finnell, 2020). This moment in time provides opportunities to implement evidence-based prevention on a large scale, as new policies have already begun to address barriers to change (Davis & Samuels, 2020; Green et al., 2020).

1.4 Current Trends in the United States

Locations around the United States are reporting preliminary increases in fatal overdoses accompanying the pandemic. Two emergency departments (ED) in San Francisco, California, saw increased frequencies within their hospital of overdose-related ED visits, non-fatal overdoses, and fatal overdoses (Rodda, West, & LeSaint, 2020). In a large study involving hospitals in Alabama, Colorado, Connecticut, North Carolina, Massachusetts, and Rhode Island, researchers found that despite a 14% decline in all-cause ED visits, visits for opioid overdoses increased 29% compared to the previous year (Soares et al., 2021).

Many studies have been performed in Kentucky, a state in the region of Appalachia that has been hit particularly hard by the opioid epidemic. Louisville, the largest city in the state, saw a 31% increase in overdoses for a 16-week time span in 2020 compared to the same weeks in 2019 (Shreffler, Shoff, Thomas, & Huecker, 2021). Outside of the hospital setting, emergency medical

services (EMS) in Kentucky saw a 71% increase in opioid overdose-related calls who refused transportation and a 50% increase in fatal overdose-related runs (Slavova et al., 2020). There are fewer analyses on overdose-related changes during the pandemic for other hard-hit states in Appalachia, such as Pennsylvania.

1.5 Allegheny County, Pennsylvania

Allegheny County, lodged in Southwestern Pennsylvania, disproportionately carries a large portion of the opioid epidemic's burden in Pennsylvania. Like much of the rest of Appalachia, Allegheny County has continued to see increases in fatal overdoses as the third wave of the opioid epidemic has planted its roots. In 2017, Allegheny County's overdose rate was more than three times the country's average overdose rate (Hulsey et al., 2020). Fentanyl has become substantially more common. In 2014, approximately 2.1% of stamp bags recovered from scenes contained fentanyl. In just two years, this measure increased to 17.1% (Creppage et al., 2018). In focus groups, more than 50% of individuals with active OUD reported suspected past-year exposure to fentanyl (McLean, Monnat, Rigg, Sterner, & Verdery, 2019). These trends in Allegheny County alone can expose individuals to an increased amount of danger.

Currently, a new, fourth wave is emerging from fentanyl and mixed substances, occurring simultaneously alongside the COVID-19 epidemic. This fourth wave may be particularly damaging to communities in regions where the epidemic already has a strong hold, such as Allegheny County (McCann Pineo & Schwartz, 2020). Effects of a rampant epidemic will not only hurt individuals, but families and communities as well. In Allegheny County, children who have lost at least one parent to OUD were at significantly higher risk for developing mental disorders

(Hulsey et al., 2020). The pandemic will only increase the likelihood of exposure to community-wide stressors that will compound on any pre-manifesting mental health disorders.

Allegheny County has historically shown that it has the potential to deliver harm reduction efforts. Harm reduction efforts, such as naloxone training delivered in a community setting, have proven beneficial (Wright, Higginbotham, Bunk, & Covvey, 2020). However, more information is vital to synthesize and deliver effective interventions and safety nets for residents.

1.6 Gaps in Knowledge

In Allegheny County, long-lasting effects of the pandemic on fatal overdose deaths for residents are still not fully known. However, many other areas around the country have reported increases in overdose fatalities due to the pandemic. It is imperative to gather more novel information so that Allegheny County can best serve its residents proactively. With more qualitative data on the ways that those who use opioids have been affected in the pandemic, larger measures may be taken to meet the needs of a community that has been continuously marginalized. Qualitative data also have the potential of providing insight on issues that affect those who do not fatally overdose, and thus are typically left out of the equation.

1.7 Public Health Significance

Both the opioid epidemic and the COVID-19 pandemic are of great public health significance, which makes their intersection a compound of uncharted waters. The opioid epidemic

is here to stay; at least 30 states have reported increased overdose rates since the start of the pandemic (A M A, 2021). Age-adjusted death rates involving synthetic opioids have increased 1,040% since 2013, yet we are still ill-equipped to implement the best harm reduction strategies (Mattson et al., 2021). Further, though the COVID-19 pandemic may not be permanent, the number of lives lost, policies changed, and systems irreparably damaged will affect residents for years to come. The pandemic has stressed the public health infrastructure and put its flaws on display. It is an unfortunate reality that these two substantially expensive historical crises call for conflicting measures. COVID-19 mitigation efforts require decreased social activities, while social interaction is a vital part of opioid use recovery and naloxone delivery. This problem extends beyond the individual. Children and families have the potential to be impacted by two traumatizing events. Overwhelmed healthcare facilities are seeing victims of both crises and running out of room and supplies. The barriers for those with OUD who do not experience fatal overdoses go unknown.

Uncovering some of the ways in which the pandemic exacerbated opioid use risk factors could instruct Allegheny County and other parts of the United States how to best support these populations. Further, this knowledge could improve disaster preparedness and install safety nets so that no populations are harmed by necessary prevention efforts such as social isolation.

2.0 Objective

The objective of this study is to examine key overdose-related terms from overdose death narratives to compare frequencies and measure trends in how the COVID-19 pandemic has affected those affected by the opioid epidemic.

3.0 Methods

3.1 Death ascertainment

Death narratives originated from 911 calls within Allegheny County that resulted in fatal overdose deaths. Multiple departments collaborated on writing each death narrative procedurally (Figure 1). Officers who arrived on scene reported the date, scene, and nature of the event and called in the investigators specializing in overdose events. The investigators then added onto the report of the scene. All medical information surrounding the event was listed on the report, including the strategies EMS used and what treatment attempts the decedent received if they were transported to an emergency department. The narratives were continuously added onto with items such as stories from bystanders and family members, medical histories, searches for family members, autopsy results, determinations of who would serve as the legal next of kin (NOK), and funeral home arrangements. The Allegheny County Office of the Medical Examiner (ACOME) added autopsy-related results. Once ACOME finished the reports, they were sent to the opioid surveillance group at ACHD.

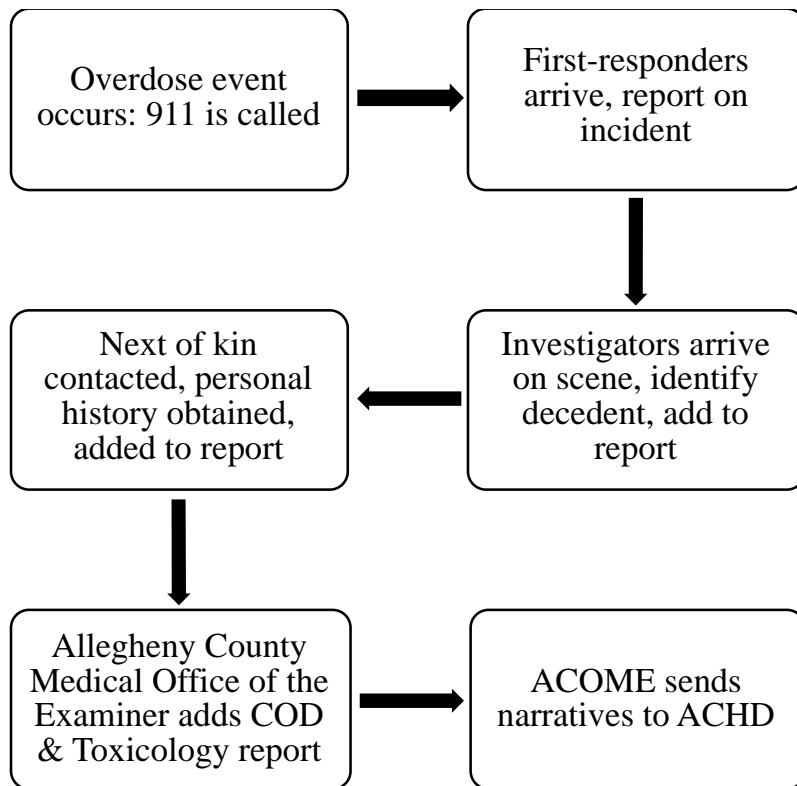


Figure 1 Death narrative formation process

3.2 Role of Overdose Surveillance Group

The overdose surveillance group received death narratives directly from ACOME for the year of 2020. Members of the overdose group with experience working with marginalized populations identified key themes of interest that were suspected to have changed via the COVID-19 pandemic and accompanying policy changes. If a term was not originally considered but frequently appeared in the narratives, it was added to the list of terms and the narratives were re-analyzed for the new term.

3.2.1 Data Extraction

Two members of the overdose surveillance group read the death narratives. One member read every record to maintain consistency. Each time a key term occurred in a narrative, it was notated in a Microsoft Excel sheet so that final counts included total number of narratives that mentioned each key term. Each narrative was identified by the restrictive COVID-19 policy phase in which it occurred by the date and time of the incident report. The final sheet was exported into a file with comma-separated variable (CSV) formatting.

3.3 Analyses

Narratives were divided in two different ways: by the restrictive color phase put in place for Allegheny County residents (red, yellow, green), and by 82 days before and after the official stay-at-home order in Allegheny County. Some topics were collapsed by overall theme for analyses to control for a low number of observations. Chi-squared tests for proportions were performed on the themes for before and after initiation of the stay-at-home order. The data analyses were generated using SAS software, Version 9.4 of the SAS System for Windows (Copyright © 2021 SAS Institute Inc. SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc., Cary, NC, USA.). Statistical significance was set at $p < 0.05$.

4.0 Results

4.1 Number of Overdose Deaths

The overdose group received 465 death narratives in total. Narratives described the conditions of the scene and any information investigators gathered on the decedent. Dates of occurrences ranged from January 1, 2020, to November 10, 2020. Narratives for dates later than November 10 were not yet completed and thus had not yet been sent to ACHD. The preliminary number of overdose deaths for months reported in 2020 was higher than that of 2019 by approximately 64 deaths.

4.1.1 Key Themes from Death Narratives

A total of 22 key terms were identified: Allegheny County Jail, jail, release, alone, quarantine, isolation, money, unemployed, job, saving money, housing insecurity, methadone/suboxone, medication-assisted treatment (MAT), prescription, naloxone/Narcan administration, avoiding healthcare, covid, delayed EMS arrival, and restriction phase color. Housing insecurity encompassed homeless, staying with friend/relative, and residing in a halfway house or three-quarter way house. Naloxone/Narcan administration encompassed administration from both first responders and bystanders. Key terms were abstracted from the complete narratives (Table 1).

Table 1 Example death narrative showing key terms

<p>Sample Narrative Case ID #1234567</p> <p>The following information was received from Medic X of the X EMS and Officer X.</p> <p>The decedent (42 YOWM) has been staying with a friend for several days. The subject was last known alive at approximately 2100 hours on May 15 and had no complaints at that time. This evening, the above’s friend found the above unresponsive on the floor of the living room and contacted 911. The <u>friend administered Naloxone</u> before EMS arrived, to no avail. Pittsburgh Medic 6 and Zone 2 Police responded, finding the decedent an obvious DOA. Medic John Doe made the pronouncement at 2352 hrs. Drug paraphernalia is present on scene.</p> <p>This investigator responded to the scene at 0113 hrs. We were met by Zone 2 Police. The residence is a single-family home in fair condition. The interior was in order but unkempt. The decedent was found lying supine on the floor of the living room. The body was cool to the touch, in mild rigor, and had faint lividity consistent with the position found. The decedent was wearing a shirt, belt, shorts, and underwear. Under the above’s body were two stamp bags marked in red ink with “Game Over.” The stamp bags were bagged up and placed in transport bag #4.</p> <p>The above’s 18YO daughter was notified and informed of ACOME protocol. Per the daughter, the above had gone to the <u>methadone clinic</u> last week to obtain a <u>prescription</u> refill. The above was given a 2 months’ supply. According to clinic staff, the above was given a greater amount of methadone due to the <u>COVID-19 pandemic</u>. The decedent reportedly had been <u>released</u> from <u>ACJ</u> in late 2019 and had been in rehab three months prior to this event.</p> <p>MHx: polysubstance abuse, Hepatitis C, and HTN.</p> <p>The decedent weighted 169 lbs upon intake and was placed in the incoming cooler.</p> <p>Toxicology reports mailed to daughter, who is reportedly speaking with the above’s parents to select a FH.</p>
<p>Key Terms Identified</p> <ul style="list-style-type: none">(1) Naloxone administered by friend(2) Picked up methadone prescription(3) COVID-19 policy allowed larger refills(4) previously released from Allegheny County Jail

4.2 Restriction Phases

The COVID-19 restriction policy phases mandated by the Commonwealth of Pennsylvania consisted of Red, Yellow, and Green. Red was the most restrictive phase, as it marked the start of the stay-at-home order. The duration of the phases in days for red, yellow, and green were 52, 21, and 158 days, respectively. Average deaths per day were not evenly distributed in the phases (Figure 2). The red phase had the highest average with 2.4 fatal overdose deaths per day. The yellow phase followed with an average of 1.81 fatal overdose deaths per day, while the green phase averaged 1.04 fatal overdose deaths per day.

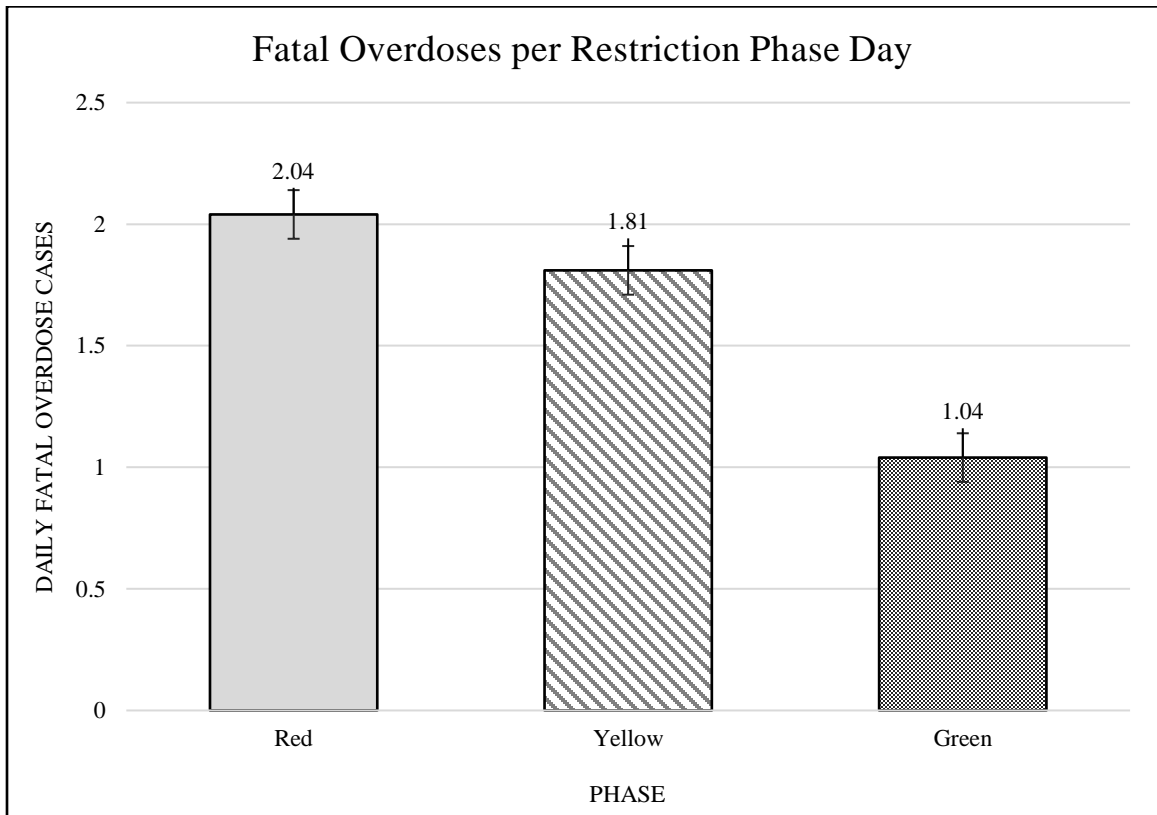


Figure 2 Average fatal overdoses per day by type of restriction phase, Allegheny County, PA

Key topics showed differences in trends by the phase type (Figure 3). Trends in topics collapsed by theme showed significant heightened case mentions of involvement with the criminal justice system, naloxone administration, and COVID-19 Pandemic protocols in the red phase. The yellow phase showed significantly higher daily case mentions of housing insecurity themes.

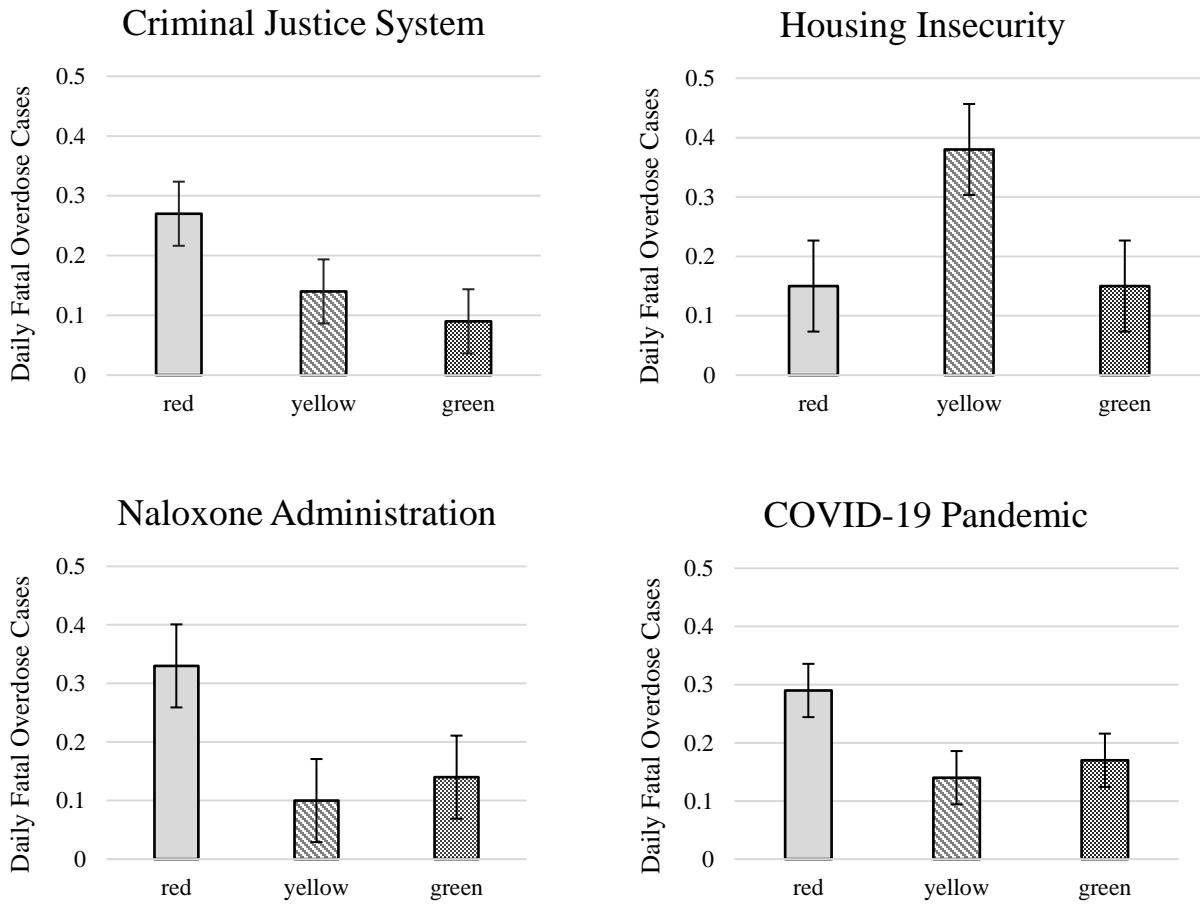


Figure 3 Average fatal overdose deaths per day by phase and key topic discussed, Allegheny County, PA

4.3 Before and After Stay-At-Home Order

Eighty-two days before the official stay-at-home order for Allegheny County yielded five fewer fatal overdose deaths than 82 days after the order. There were 153 fatal overdose death narratives from before the order, and 158 narratives after. Overall, there were increases in the percentage of cases after the stay-at-home order mentioning the criminal justice system, housing insecurity, medication-assisted treatment, and the pandemic (Table 2). Average daily cases mentioning pandemic-related topics had the largest percent increase, as cases after the stay-at-home order mentioned the pandemic 12.6% more than cases before. Mention of naloxone administration topics decreased by 5.7% after the stay-at-home order (Table 2).

Table 2 Percent increase in the number of cases mentioning topic of interest from up to 82 days before the stay-at-home order to 82 days after

Topic Discussed	% Increase in Case Mentions
Criminal Justice System	2.9
Housing Insecurity	6.8
Medication-Assisted Treatment	7.3
Naloxone Administration	-5.7
COVID-19 Pandemic	12.6

Note: The criminal justice system themes include topics of jail, Allegheny County Jail, and release. The housing insecurity theme includes housing insecurity in the forms of homelessness, residing with friends or relatives, and residing in a half-way house or three quarter-way house. The medication-assisted treatment theme includes topics of medication-assisted treatment, prescriptions, methadone, and suboxone. The naloxone administration theme includes naloxone administered by both bystanders and first responders. The COVID-19 Pandemic theme included topics of COVID-19, pandemic, quarantine, and isolation.

The change in cases mentioning several themes differed significantly. The number of cases discussing pandemic-related themes was significantly higher after the stay-at-home order ($p=0.000014$). The number of cases discussing themes of housing insecurity was significantly higher after the stay-at-home order ($p=0.03$). The number of cases discussing naloxone-administration themes and criminal justice system themes were higher after the stay-at-home order, but were not significant ($p=0.18$, $p=0.34$). The number of cases discussing medication-assisted treatment themes approached a significance increase after the stay-at-home order ($p=0.059$).

5.0 Discussion

The results of this work concur with the few published studies investigating increases in fatal overdose cases during the COVID-19 pandemic (Haley & Saitz, 2020; Slavova et al., 2020; Zolopa et al., 2021). This pandemic altered life for all individuals, but specifically for those who use substances. The red restriction phase, the most restrictive out of the three, showed the highest rate of fatal overdose deaths per day. This is consistent with findings in other locations around the country (Ivey & Clifton, 2021; Mason, Welch, Arunkumar, Post, & Feinglass, 2021). With increased amounts of restriction, in daily life, individuals may not have had a chance to receive support they needed across multiple areas.

Each of the themes followed this order of increased mentions during changes brought on by the pandemic except for the theme of housing insecurity. It may have taken time for pandemic-related changes affecting housing security to set in. Individuals may have lost jobs, losing the ability to pay for their residence or utilities as a consequence. This seems like a plausible explanation for these findings given that there was a significant increase in mentions of housing insecurity from before the stay-at-home order to after the order took place.

Though changes in cases discussing naloxone administration were not statistically significant, it is important to note the downward trend. Uniquely, mentions of naloxone administration appeared to decline after the stay-at-home order, which was the only theme to do this. This trend may be a repercussion from similar effects of the restrictiveness of stay-at-home orders. The lack of people present in a given area may have decreased chances for a bystander to be available to call EMS or distribute naloxone themselves to someone who was experiencing an overdose.

Though mentions of terms related to jail only increased by 2% from before and after the stay-at-home order, incarcerated populations should still be observed for trends. This sample did not cover those already in the criminal justice system. Individuals in the criminal justice system and who are currently in prison for substance use-related charges may be contracting COVID-19 at higher rates or may be placed in stressful, overcrowded environments.

This study has multiple strengths. The data source (ACOME) has standardized the process for different persons to collaborate on the same narrative consistently. Utilizing sound extraction methods, this project gives meaning and context to the qualitative data surrounding the deaths of those who have overdosed. Instead of sheer mortality numbers, this analysis offers insights to what is affecting those with OUD and in what ways. Capturing information on those who have not fatally overdosed is often difficult but knowing these factors can offer evidence for supportive infrastructure development and guidance for policy change.

This study captured information on the epidemic/pandemic intersection in a region that has been ravaged by the opioid epidemic. Normally, literature on the opioid epidemic in this region is slim. In the recent wake of the pandemic, it is even more rare. More information on this problem offers insight on compounding fatal circumstances. Further, information on this problem within this area offers insights to any unique traits in this region.

This study highlights the need for support. Necessary public health efforts such as social distancing and limits on capacity can be harmful for those with OUD (Zolopa et al., 2021). In order to successfully execute vital prevention efforts in the wake of disasters, supports must be implemented to provide safety to the populations whose barriers will be exacerbated.

This study also has limitations. First, only a limited amount of data was available. This presented challenges to analyzing the frequencies of key terms. Though there were data for 82

days before the stay-at-home order, this may not reflect the normal landscape of Allegheny County as a complete control. In the 82 days before the stay-at-home order, anxieties may have risen over anticipation and fear of COVID-19 reaching the local area. Further, death narratives contain a multitude of information, but it is possible that some occurrences of the topics of interest may not have been documented on some death narratives. This limitation may leave the counts of topics underreported, diluting the themes. Better documentation would strengthen the findings, but emerging themes are present.

In the future, Allegheny County death narratives for 2019 will undergo the same process. This will allow for more data to be obtained for further analyses. The data for each restriction phase can be compared to the exact dates occurring one year earlier. Additionally, more data will offer opportunities to forgo collapsing common themes to obtain a more detailed view of potential differences between similar topics such as the type of housing insecurity a person faces or whether naloxone was distributed by a bystander or first responder.

Recommendations from this study can encourage more counties and regions to investigate the effects of the COVID-19 pandemic on the opioid epidemic. By doing this, communities can be more informed and develop ways to support and protect their own members who go unseen. Further, this type of analysis can be used on the intersection of the pandemic on other localized health issues, such as high asthma rates, obesity rates, and food insecurity.

In conclusion, investigating key factors affecting those who use drugs helps display and communicate the manners in which the COVID-19 pandemic and coinciding stay-at-home orders affected this population. Identifying local effects on vulnerable populations for the public has the potential to raise awareness on health disparities that can be exacerbated in system-stressing events. With more research on which factors are most vital to those who face substance use, local,

state, and federal agencies will have opportunity to vastly improve disaster preparedness for marginalized populations and stem this public health crisis.

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